

An Automated Washing and Ventilation System for Surface Energy Budget Monitoring Instrumentation

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An important, but difficult to quantify, source of variability in monitoring surface energy budget components is the extinction of radiation by dust and debris on sensor windows and domes. The CMDL baseline stations rely on a daily cleaning schedule to reduce the effects of foreign material on radiation measurements. At some locations, particularly sea level maritime sites, the location of sensors at ground level near an ocean exposes the sensors to a constant process of salt-spray deposition that can significantly deplete the radiation reaching detectors. The Kwajalein monitoring site is an example of such a CMDL maritime location. This presentation describes a system that automatically sprays a high-pressure stream of water on sensor windows and domes at programmed intervals or manually by station personnel (Figure 1). In addition to the washing capability, the system includes a continuously operating air blower that directs a jet of filtered air at each sensor window and dome to isolate the window surface from ambient air and any airborne contaminants it may contain. This system was installed at the Kwajalein site in January 2004 and has been in continuous operation. The results have been encouraging, and additional installations at other CMDL surface radiation monitoring sites will be added as needed. The system uses all off-the-shelf components and mounts on existing sensors and solar trackers. The goal is to minimize the random and undocumented effects on measurements because of airborne contaminants. Examples of the impact on field data will be given.



Figure 1. Kwajalein sensor and dome washing and ventilation system.